IN THE CLAIMS:

Please add new claims 14-34 as set out in the following listing of the claims. This claim listing supersedes and replaces all prior listings of the claims.

1. (Original) Method to perform a cycle synchronization between interconnected sub-networks, characterized in that a reference node connected to one of the sub-networks transmits a respective cycle time information to cycle masters of all other sub-networks at recurring time instants, and the cycle masters of all other sub-networks adjust their cycle time accordingly.

2. (Original) Method according to claim 1, characterized in that an adjustment of the cycle time within a cycle master is performed by the following steps: determining a first time interval Δt_1, $\Delta t_{1'}$) in-between two receptions of cycle time information from the reference node with an own clock, determining a second time interval (Δt_2, $\Delta t_{2'}$) in-between two corresponding transmissions of cycle time information from the reference node on basis of the received cycle time information, comparing the first time interval Δt_1, $\Delta t_{1'}$) and the second time interval Δt_2, $\Delta t_{2'}$), and adjusting the own cycle length according to the comparison result.

3. (Original) Method according to claim 2, characterized in that the comparison of the first time interval (Δt_1, $\Delta t_{1'}$) and the second time interval (Δt_2, $\Delta t_{2'}$) considers a preceding adjustment of the own cycle length.

4. (Previously Presented) Method according to claim 2, characterized in that the adjustment of the own cycle length within a cycle master is performed in a step-wise manner.

5. (Previously Presented) Method according to claim 2, characterized in that the adjustment of the own cycle length within a cycle master is performed by adjusting a local number of clocks within one cycle.

6. (Original) Method according to claim 5, characterized in that the adjustment of the own cycle length within a cycle master is performed by setting the local number of clocks equal to an ideal number of clocks of one cycle in case the first time interval (Δt_1, $\Delta t_{1'}$) and the second time interval (Δt_2, $\Delta t_{2'}$) are identical, smaller than an ideal number of clocks of one cycle in case the first time interval (Δt_1, $\Delta t_{1'}$) is smaller than the second time interval (Δt_2, $\Delta t_{2'}$), and larger than an ideal number of clocks in case the first time interval (Δt_1, $\Delta t_{1'}$) is larger than the second time interval (Δt_2, .$\Delta t_{2'}$).

7. (Original) Method according to claim 6, characterized in that a step-width to adjust the own cycle timer within a cycle master is set according to the difference of the first time interval (Δt_1, $\Delta t_{1'}$) and the second time interval (Δt_2, $\Delta t_{2'}$).

8. (Previously Presented) Method according to claim 1, characterized in that the cycle time information transmitted by the reference node is a content of its cycle time register.

9. (Original) Method according to claim 8, characterized in that the adjustment of the own cycle time within a cycle master is performed by adjusting the average difference between a time interval of two transmissions of cycle time information of the reference node which is determined by subtracting two succeeding received contents of the cycle time register of the

reference node and a time interval of two samplings of the own cycle timer which is determined by subtracting two succeeding sampled contents of the own cycle time register plus a corrective difference to be zero.

10. (Original) Method according to claim 9, characterized in that the corrective difference corresponds to the preceding adjustment.

11. (Previously Presented) Method according to claim 1, characterized in that the recurring time instants are determined according to a regular time interval with a small variation.

12. (Original) Cycle synchronizator, characterized by a clock offset estimation means (1) to determine a timing error of an own cycle timer (3), and a cycle adjustment loop (2) receiving the timing error determined by said clock offset estimation means (1) to adjust the own cycle timer (3) to reduce its timing error.

13. (Original) Cycle synchronizator according to claim 12, characterized by a de-jitter filter (4) arranged in-between the clock offset estimation means (1) and the cycle adjustment loop (2) to filter said determined timing error.

14. (New) A method for performing cycle synchronization in a network comprising a plurality of interconnected busses, one of which comprises a reference node and the others of which each comprises a cycle master, comprising the steps of:

receiving, at one or more of said cycle masters, cycle time information from said reference node;

adjusting a cycle length at said one or more of said cycle masters, respectively, by a value selected from the group consisting of +n, 0 and -n ticks based on said received cycle time information.

15. (New) The method of claim 14, where n=1.

16. (New) A method for performing cycle synchronization in a network comprising a plurality of interconnected busses, said method comprising the step of:

adjusting a cycle duration that determines a cycle frequency of one of said busses by a value selected from the group consisting of +n, 0 and -n ticks.

17. (New) The method of claim 16, wherein said adjusting of a cycle duration comprises adjusting the number of ticks per cycle of a cycle timer of a node local to said one bus.

18. (New) The method of claim 16, wherein said adjusting is effected on. the basis of cycle time information received from a node remote to said one bus.

19. (New) The method of claim 18, wherein said adjusting is effected on the basis of cycle time information.

20. (New) The method of claim 16, wherein said adjusting yields subsequent cycles whose cycle duration does not differ by more than n.

21. (New) The method of claim 16, wherein n=1.

22. (New) A cycle synchronizer for use in a network comprising a plurality of interconnected busses, comprising:

a cycle timer; and means configured and adapted for adjusting a cycle duration that determines a cycle frequency of said cycle timer by a value selected from the group consisting of +n, 0 and -n ticks.

23. (New) The cycle synchronizer of claim 22, comprising:

means configured and adapted for receiving cycle time information, wherein said cycle synchronizer is configured and adapted to effect said cycle duration adjustment on the basis of said received cycle time information.

24. (New) The cycle synchronizer of claim 22, wherein said cycle synchronizer is configured and adapted to effect said cycle duration adjustment such that the cycle duration of subsequent cycles does not differ by more than n.

25. (New) The cycle synchronizer of claim 22, wherein n=1.

26. (New) A network device for use in a network comprising a plurality of interconnected busses, comprising:

a cycle timer; and

cycle duration adjustment means configured and adapted for adjusting a cycle duration that determines a cycle frequency of said cycle timer by a value selected from the group consisting of +n, 0 and -n ticks.

27. (New) The network device of claim 26, wherein said cycle duration adjustment means is configured and adapted to effect said adjusting of said cycle duration such that the cycle duration of subsequent cycles does not differ by more than n.

28. (New) The network device of claim 26, wherein n=1.

29. (New) A network comprising:

a plurality of interconnected busses including a first bus and a second bus remote to said first bus;

a first network device in accordance with claim 26 as a local node of said first bus, wherein

said first network device is configured and adapted such that said cycle frequency of said cycle timer dictates a cycle frequency of said first bus.

30. (New) The network of claim 29, comprising:

a second network device local to said second bus and configured and adapted for transmitting cycle time information; and

clock offset estimation means, local to said first bus, configured and adapted for receiving said cycle time information, for establishing an estimation of cycle synchronization between said first bus and said second bus on the basis of said received cycle time information and for providing information on the basis of which said cycle duration adjustment means performs said adjusting.

31. (New) The network of claim 30, wherein said second network device is configured and adapted for transmitting cycle time information at regular intervals.

32. (New) The network of claim 30, wherein said cycle time information is indicative of content of a cycle time register of said second network device.

33. (New) The network of claim 32, wherein

said second network device comprises a cycle timer, the cycle frequency of which dictates a cycle frequency of said second bus, and

said cycle timer of said second network device comprises said cycle time register.

34. (New) A device for performing cycle synchronization in networks including a plurality of local networks in which at least there are a reference node and cycle masters which are connecting to said local networks respectively, the device comprising:

means for receiving reference cycle time information supplied from said reference node and local cycle time information stored in a register of said cycle master connected to said local network;

means for detecting a difference between said reference cycle time information and local cycle time information; and

means for adjusting counter value of said register based on the detected difference in order to perform said cycle synchronization so that the counter value is selected from ternary values consisting of high, middle and low, wherein said the adjustment of the center value is limited to +/-1 value and the adjustment is only allowed to jump between middle and high or between middle to low.